Mountain View Power Partners

Capacity Demonstration Test

1. Definition and Purpose

The Capacity Demonstration Test ("CDT") for Mountain View Power Partners I ("MVPP") and Mountain View Power Partners II ("MVPP II") (collectively, "MV") is intended to confirm in an objective and measurable manner that the actual output produced by MV is greater than or equal to 75% of the predicted output as determined herein.

2. Test Overview

2.1 The protocol uses input mean wind speed data taken at intervals of ten minutes from a reference anemometer, which is scaled to reflect the aggregate long-term mean annual hub-height wind speed for the entire project, then combined with the Mitsubishi Wind Turbine Model MWT-600-44 and MWT-600-45 power curve that is site specific for the MV project to yield gross energy prediction, which in turn is discounted for loss factors to predict net energy production.

2.2 The input for wind flow is the Catellus South anemometer (Site #390), located south and west of the most upwind (westerly) row of the MV wind farm. Wind speed measurement height is 60 meters. There are no other turbines for miles to the west of this anemometer, so it truly measures the stream wind flow to the wind farms at the throat of San Gorgonio Pass. Catellus South anemometer was used for the turbine acceptance test and was utilized in the wind model during development of the project. The sixty-meter meteorological mast is installed approximately 6.8 rotor diameters west-southwest of turbine location 70-12 on the Catellus section of the MV property. This mast is also commonly referred to as the "Catellus South Mast".)

2.3 Should valid wind data for a given hour not be available from Site 390, the 60-m wind speed from anemometer MT26 (commonly referred to as the Catellus Project Mast) will be used. This backup anemometer is located 2 ½ rotor diameters upwind of turbine 70-12, which is the most westerly of all turbine rows. Except for the occasional easterly winds, MT26 will experience virtually identical winds to the Catellus South Mast.

2.4 The number of turbines in the MV project, their hub heights and rotor diameters is given below in Table 1:

Table 1. Turbine Count, Height and Diameter

Partnership/Property	Turbine Count	Hub Height (m)	Rotor Diameter (m)
MVPP, Catellus	45	60	45
MVPP, Alexander	8	60	45
MVPP, Phoenix	11	50	44
MVPP, 16 West	10	50	44
MVPP II, Alexander	37	60	45
Combined Total	111		

2.5 The predicted aggregate long-term mean annual wind speed at the 60m level of the Catellus South Mast is 10.07 meters/second (mps). The predicted aggregate long-term mean annual hub-height wind speed for MVPP is 8.94 mps, incorporating wake losses from turbine row to turbine row. The equivalent aggregate long-term mean annual hub-height wind speed for MVPP II is 8.87 mps; incorporating wake loses from turbine row to turbine row. Therefore, the combined aggregate long-term mean annual hub-height wind speed for both projects is 8.92 mps.

The CDT will thus take the input wind speed data from Catellus South Mast and multiply it by the ratio 8.92/10.07, or 0.886, to estimate the equivalent aggregate hub-height wind speed at the 111 turbines for the same time period.

2.6 Table 2 shows the individual power curves for the two rotor diameters, plus the "combined" power curve weighted by the number of turbines of each model.

To run the model, the adjusted wind speed will use the look-up table (from Table 2) to convert wind speed into power output for a single turbine. The resulting output will be multiplied by 111 to predict aggregate gross output for the entire wind farm (MVPP and MVPP II combined).

Table 2. MV Power Curves for MWT-600 Wind Turbines

(Air Density 1.15 kg/m*)

Hub-Height Speed (mps)	Power (KW) 45-m Rotor	Power (KW) 44-m Rotor	Power (KW) Combined*
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	32	30	31.6
6	76	73	75.4
7	123	118	122.1
8	184	174	182.1
9	266	263	265.2
10	357	334	352.6
11	450	418	443.9
12	541	496	532.9
13	600	586	583.6
14	600	600	600
15	600	600	600
16	600	600	600
17	600	600	600
18	600	600	600
19	600	600	600
20	600	600	600
21	600	600	600
22	600	600	600
23	600	600	600
24	600	600	600
25	600	600	600
26+	0	0	0

*90 turbines have 45-m rotor diameters,
21 have 44-m rotor diameters

2.7 The calculated predicted gross output (or ideal output) as calculated above is required to be corrected to a predicted net output (or actual output) to account for various actual discount factors, which are identified below:

- transformer/line loss and aux load 3%
- high wind speed hysteresis envelope adjustment 1.6%

- off-axis wake and sector management losses, 0.4%
- turbulence loss, 1%
- blade contamination loss, 1%
- air density loss, 0.3%

Combined discounts are obtained by multiplying the "efficiencies" (100% minus the discount factor) from all sources. For the MV project, this works out to an overall discount factor of 7.1%

2.8 Predicted net output for each sampling period will be compared to actual energy production read from the high-side of the utility meter at the MV substation. The ratio of actual to predicted energy production is the "Availability Factor."

2.9 The CDT shall be conducted (upon a written request of Party B to Party A prior to January 1st of each year) during the period from March 1st to June 30th, unless extended pursuant to Section 2.11.

2.10 In computing the above summary statistics, periods when the individual turbines or the entire MV project is incapable of delivering energy due to causes outside the wind farm (e.g., grid outages, mandated curtailments, force majeure events) will not be included and the duration of the CDT will be extended for an equivalent period of time. Any events that render an individual turbine or the entire MV project incapable of delivering power pursuant to Section 2.10 shall be reported to Party B by Party A, including details of the event and the turbine(s) affected. The calculation determining the length of the extension of the duration of the CDT shall also be provided to Party B by Party A by June 30th.

3.0 <u>Calculation of Predicted Output</u>

3.1 Determine average wind speed at the Catellus South Mast (site 390) based on 10 minute intervals:

meters/sec ("MPS")

3.2 Correct observed wind speed to MV aggregate wind speed:

MPS x 0.886 = MV MPS

3.3 Interpolate MV MPS to corresponding gross output per Table 2:

MV MPS as adjusted per Table 2 = Gross turbine kW

3.4 Determine facility output for number of turbines:

No. of Turbines (111) x Gross Turbine kW = Gross kW

3.5 Determine net facility output for that hour:

Gross kW x (100 - 7.1%) = Predicted Net kW

4.0 <u>Determination of Actual Net Facility Output</u>

4.1 Actual output equals the energy delivered to the interconnection point on the high side of the transformer as recorded on the MV project meter.

4.2 It is understood that the energy output registered on the MV project meter is adjusted for losses through the transformer and no further adjustment is required or is necessary. In the event the project meter is faulty, the parties agree to use the back-up meters to calculate the actual output.

5. <u>Calculation of Availability Factor</u>

5.1 Actual Net Facility Output/Predicted Net kW = Availability Factor (%)

5.2 If the Availability Factor is greater than or equal to 75% for any consecutive 100 hours during the CDT, the MV project satisfies the test criteria.

5.3 Representatives of Party B shall have the right to be present at the Projects and witness the CDT upon reasonable notice to MV. Upon completion of the CDT, MV shall submit a written report to Party B describing the results of the CDT in accordance with the sample report included herein as Attachment 1.